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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/577,255

04/26/2006

Hiroe Ishikura

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05/21/2008

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EXAMINER

EOFF, ANCA

ART UNIT

PAPER NUMBER

1795

MAIL DATE

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05/21/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/577,255	<b>Applicant(s)</b> ISHIKURA ET AL.	
	<b>Examiner</b> ANCA EOFF	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04/26/2006, 02/06/2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>04/26/2006, 02/06/2008</u> .                                  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. Claims 1-15 are pending in the application.
2. The foreign priority document JP 2004-190484, filed on June 28, 2004 was received and acknowledged. However, in order to benefit of the earlier filing date, a certified English translation is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 14 depends on claim 6 and recites the limitation "the discharge pressure generating element" but there is insufficient antecedent basis for this limitation in the claim 6.

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraph of 35 U.S.C. 102 that forms the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –  
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Nguyen et al. (US Patent 5,919,601).

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With regard to claims 1-5, Nguyen et al. disclose a radiation-sensitive composition comprising a thermal-activated acid generator, a crosslinking resin and a binder resin with reactive pendant groups, such as carboxylic acid groups (abstract).

The thermal-activated acid generator promotes the crosslinking between the crosslinking resin and the binder resin, when the composition is exposed to a suitable radiation source and may be a salt containing an onium cation and a non-nucleophilic anion (column 2, lines 33-41). A specific example of such thermal-activated acid generators is triarylsulphonium hexafluoroantimonate (column 10, lines 48-49 and column 11, lines 30-31).

The crosslinking resin may be a C<sub>1</sub>-C<sub>5</sub> alkoxymethyl melamine (column 2, lines 62-65), which is equivalent to the compound of formula (2) in claim 2 of the instant application, wherein R<sup>1</sup>-R<sup>6</sup> are C<sub>1</sub>-C<sub>5</sub> alkoxymethyl groups.

The binder resin may be:

- a styrene / butyl methacrylate / methyl methacrylate /methacrylic acid polymer (column 3, lines 19-20), which is equivalent to the polymer comprising the groups in formula (1) of claim 1 of the instant application, wherein R<sup>1</sup> and R<sup>2</sup> are methyl groups, X is a – OH group and R<sup>3</sup> is a methyl group.

- a styrene/ethyl methacrylate/ 2-hydroxyethyl methacrylate / methacrylic acid polymer (column 3, lines 23-24), which is equivalent to the polymer comprising the groups in formula (1) of claim 1 of the instant application, wherein R<sup>1</sup> and R<sup>2</sup> are methyl groups, X is a – OH group and R<sup>3</sup> is a an ethyl group.

The limitations of claim 3 and 4 regarding the intermolecular crosslinking reaction of the photosensitive resin composition through a crosslinker proceeding by heating and the main chain decomposition reaction proceeding by irradiation of ionizing radiation are process limitation and do not add any patentable weight to the composition claims.

The composition of Nguyen et al. is not disclosed as a positive-working photosensitive composition but it has the same components as the photosensitive resin composition of the instant application so it would be capable of functioning as such.

7. Claim 15 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kubota et al. (EP 1 380 423).

Claim 15 is a product-by-process claim, and the process of obtaining a product does not add any patentable weight to said product.

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (MPEP 2113)

Kubota et al. disclose a liquid discharge head (par.0048 and fig. 1E), which is identical to the ink jet head of the instant application, as disclosed on page 32 of the specification and as shown in fig. 8. In the alternative, the ink jet head of the instant application is obvious over the liquid discharge head of Kubota et al.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imai et al. (US Pg-Pub 2004/0081914) in view of Murata et al. (US Patent 6,074,802)

With regard to claim 1, Imai et al. disclose a positive sensitive resin composition comprising a base polymer, an ether-bond-containing-olefinic unsaturated compound and an acid generating agent (abstract), wherein the base polymer comprises:

- vinylphenol units (I) (par.0019);
- units (II) of a methacrylate ester of a C<sub>1</sub>-C<sub>8</sub> alkyl (par.0020-0021), wherein the C<sub>1</sub>-C<sub>8</sub> alkyl is preferably methyl, ethyl, n-propyl, isopropyl, 2-hydroxyethyl (par.0058).
- units (III) of (meth)acrylic acid (par.0021-0022).

A polymer comprising units (I), (II) and (III) is equivalent to the polymer comprising the units of formula (1) of the instant application, wherein R<sup>1</sup>, R<sup>2</sup> may be hydrogen atoms or methyl group, X is a hydroxyl group and R<sup>3</sup> may be methyl, ethyl, n-propyl, isopropyl, 2-hydroxyethyl.

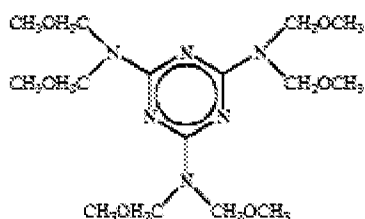
The ether-bond-containing-olefinic unsaturated compounds act as crosslinkers (par.0110).

However, Imai et al. fail to disclose that a condensable crosslinker may be used in the positive sensitive composition.

Murata et al. disclose a positive photosensitive composition comprising an alkali-soluble resin and a compound capable of crosslinking the alkali-soluble resin by a thermal action (abstract), wherein the alkali-soluble resin may be a polyvinylphenol resin (column 3, lines 15-19 and lines 53-56 ) and the thermal crosslinking compound may be an amino group having at least two functional groups, such as methylol groups or alkoxymethyl groups (column 28, line 65-column 29, line 4). The crosslinkers may be melamine derivatives (column 29, lines 29-31).

Since crosslinkers are successfully used by Murata in positive photosensitive compositions comprising alkali soluble resins, it would have been obvious to one of ordinary skill in the art to use the crosslinkers of Murata et al. in the positive sensitive compositions of Imai et al., with a reasonable expectation of success.

With regard to claim 2, Murata et al. disclose a crosslinker represented by the formula (I):



(I) (compound (T-1-1) in column 30, lines 40-50 ), which is equivalent to the compound of formula (2) of the instant application wherein R<sup>1</sup>-R<sup>6</sup> are methoxymethyl groups.

The limitations of claim 3 and 4 regarding the intermolecular crosslinking reaction of the photosensitive resin composition through a crosslinker proceeding by heating and the main chain decomposition reaction proceeding by irradiation of ionizing radiation are process limitation and do not add any patentable weight to the composition claims.

With regard to claims 4-5, Imai et al. disclose that the photo-acid generating agents of the positive sensitive resin composition may be diaryliodonium and triarylsulfonium salts (par.0104).

10. Claims 6-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubota et al. (EP 1 380 423) in view of Imai et al. (US Pg-Pub 2004/0081914) and in further view of Murata et al. (US Patent 6,074,802).

With regard to claim 6, Kubota et al. disclose a producing method for forming a liquid discharge head, said process comprising the steps of:

- providing on the substrate (201) a liquid discharge energy generating element (202) (par.0054 and fig.5), equivalent to step (1) of the instant application;
- forming a crosslinkable positive-working resist layer (203) on the substrate (201) bearing the liquid discharge energy generating elements (202) (par.0057 and fig.6), equivalent to step (2) of the instant application;
- subjecting the thermally crosslinking positive-working resist layer (203) to patterning (exposure and development) (par.0058 and fig. 7), equivalent to step (3) of the instant application;



- forming a layer of a liquid flow path structure material (207) to cover the patterned and thermally crosslinked positive-working resist layer (203) (par.0059 and fig.8), wherein the liquid flow path structure material (207) is equivalent to the coating resin layer of the instant application and the step is equivalent to step (4) of the instant application;

- patterning and developing the ink discharge port (209) on the liquid flow path structure material (207) (par.0060 and fig.9), equivalent to the step (5) of the instant application, and

- irradiating ionizing radiation toward the liquid flow path structure material (207), thereby decomposing the mold pattern constituted of the thermally crosslinking positive-working resist and immersing in solvent to remove the mold pattern (par.0063-0064 and fig. 11 and 12), equivalent to the step (6) of the instant application.

For the process of producing a liquid discharge head described above, Kubota et al. use a positive-working photosensitive material comprising a polymer with an acrylic ester unit and an acrylic acid unit (abstract). Kubota et al. further disclose that by heating the positive-working photosensitive material, a crosslinked layer is formed and by irradiation with a ionizing radiation, the crosslinked layer is decomposed (par.0010).

However, Kubota et al. do not disclose the use of a positive-working material comprising a condensable crosslinker for the process of producing a liquid discharge head.

Imai et al. disclose a positive sensitive resin composition comprising a base polymer, an ether-bond-containing-olefinic unsaturated compound and an acid generating agent (abstract), wherein the base polymer comprises:

- vinyphenol units (I) (par.0019);
- units (II) of a methacrylate ester of a C<sub>1</sub>-C<sub>8</sub> alkyl (par.0020-0021), wherein the C<sub>1</sub>-C<sub>8</sub> alkyl is preferably methyl, ethyl, n-propyl, isopropyl, 2-hydroxyethyl (par.0058).
- units (III) of (meth)acrylic acid (par.0021-0022).

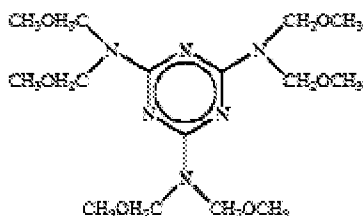
A polymer comprising units (I), (II) and (III) is equivalent to the polymer comprising the units of formula (1) of the instant application, wherein R<sup>1</sup>, R<sup>2</sup> may be hydrogen atoms or methyl group, X is a hydroxyl group and R<sup>3</sup> may be methyl, ethyl, n-propyl, isopropyl, 2-hydroxyethyl.

The ether-bond-containing-olefinic unsaturated compounds act as crosslinkers, as disclosed in par.0110: when the composition is heated, the carboxyl group and an unsaturated ether group form a crosslink via addition reaction, to make the film insoluble to a solvent or aqueous alkali solution. By irradiating with an active energy beam and then heating it, an acid is generated and the crosslinked structure is cleaved, therefore the exposed area becomes soluble to a solvent or aqueous alkali solution.

Due to the fact that the positive-working compositions of Kubota et al. and Imai et al. are functionally equivalent (as shown in par.0010 of Kubota and par.0110 of Imai), it would have been obvious to one of ordinary skill in the art at the time of the invention to use the positive sensitive composition of Imai et al. in the process for producing a liquid discharge head of Kubota et al., with a reasonable expectation of success.

However, Kubota modified by Imai et al. do not teach that a condensable crosslinker may be used in the positive sensitive composition.

Murata et al. disclose a positive photosensitive composition comprising an alkali-soluble resin and a compound capable of crosslinking the alkali-soluble resin by a thermal action (abstract), wherein the alkali-soluble resin may be a polyvinylphenol resin (par.0019 and 0024) and the thermal crosslinking compound may be an amino group having at least two functional groups, such as methylol groups or alkoxymethyl groups (par.0040). The crosslinkers may be melamine derivatives (part.0042), such as the compound of formula (I):



(I) (compound (T-1-1) in column 30, lines 40-50 ), which is equivalent to the compound of formula (2) of the instant application wherein R<sup>1</sup>-R<sup>6</sup> are methoxymethyl groups.

Since crosslinkers are successfully used by Murata in positive photosensitive compositions comprising alkali soluble resins, it would have been obvious to one of ordinary skill in the art to use the crosslinkers of Murata et al. in the positive sensitive compositions of Kubota modified by Imai, with a reasonable expectation of success.

With regard to claims 7-8, Imai et al. disclose that the photo-acid generating agents of the positive sensitive resin composition may be diaryliodonium and triarylsulfonium salts (par.0104).

With regard to claims 9-11, Kubota et al. further disclose that the developing liquid comprises diethylene glycol monobutyl ether, ethanolamine and morpholine (par.0076).

With regards to claims 12-13, Kubota et al. disclose that the negative working photosensitive material used for the liquid flow path is constituted of an epoxy resin and an onium salt generating a caution under a light irradiation (par.0042).

With regard to claim 14, Kubota et al. disclose that the liquid discharge energy generating element is an electrothermal converting element (par.0054).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANCA EOFF whose telephone number is (571)272-9810. The examiner can normally be reached on Monday-Friday, 6:30 AM-4:00 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. E./

Examiner, Art Unit 1795

/Cynthia H Kelly/

Supervisory Patent Examiner, Art Unit 1795